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MAY 12 2003  
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Gag\_AF110965\_BW\_mod

ATGGGGCGCCCGCCAGCATCCTGCGCGGCGGCAAGCTGGACGCCTGGGAGCGCATCCGCC  
TGCGCCCCGGCGGCAAGAAGTGCTACATGATGAAGCACCTGGTGTGGGCCAGCCGCGAGCT  
GGAGAAGTTTCGCCCTGAACCCCGGCTGCTGGAGACCAGCGAGGGCTGCAAGCAGATCATC  
CGCCAGCTGCACCCCGCCCTGCAGACCGGCAGCGAGGAGCTGAAGAGCCTGTTCAACACCG  
TGGCCACCCTGTACTGCGTGACGAGAAGATCGAGGTCGCGACACCAAGGAGGCCCTGGA  
CAAGATCGAGGAGGAGCAGAACAAGTGCCAGCAGAAGATCCAGCAGGCCGAGGCCGCCGAC  
AAGGGCAAGGTGAGCCAGAACTACCCCATCGTGCAAGCCTGCAGGGCCAGATGGTGCACC  
AGGCCATCAGCCCCCGCACCCCTGAACGCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAG  
CCCCGAGGTGATCCCCATGTTACCCGCCCTGAGCGAGGGCGCCACCCCCCAGGACCTGAAC  
ACGATGTTGAACACCGTGGGCGGCCACCAGGCCGCATGCAGATGCTGAAGGACACCATCA  
ACGAGGAGGCCCGCCGAGTGGGACCGCGTGACCCCGTGACGCGGCCCCCATCGCCCCGG  
CCAGATGCGCGAGCCCCGCGGCAGCGACATCGCCGGCACCACCAGCACCCCTGCAGGAGCAG  
ATCGCCTGGATGACCAGCAACCCCCCATCCCGTGGGCGACATCTACAAGCGGTGGATCA  
TCCTGGGCCTGAACAAGATCGTGCGGATGTACAGCCCCGTGAGCATCCTGGACATCAAGCA  
GGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAG  
CAGAGCACCCAGGAGGTGAAGAACTGGATGACCGACACCCTGCTGGTGCAGAACGCCAACC  
CCGACTGCAAGACCATCCTGCGCGCTCTCGGCCCCGGCGCCAGCCTGGAGGAGATGATGAC  
CGCCTGCCAGGGCGTGGGCGGCCCCAGCCACAAGGCCCGCGTGCTGGCCGAGGCGATGAGC  
CAGGCCAACACCAGCGTGATGATGCAGAAGAGCAACTTCAAGGGCCCCCGGCGCATCGTCA  
AGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAA  
GGGCTGCTGGAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCC  
AACTTCCTGGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCCGGCAACTTCCTGCAGAGCC  
GCCCCGAGCCACCGCCCCCCCCCGCGAGAGCTTCCGCTTCGAGGAGACCACCCCCGGCCA  
GAAGCAGGAGAGCAAGGACCGCGAGACCCTGACCAGCCTGAAGAGCCTGTTCCGGCAACGAC  
CCCCTGAGCCAGTAA

FIG. 1



2/23

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ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGAGAAGCTGGACAAGTGGGAGAAGATCCGCC  
TGCGCCCCGGCGGCAAGAAGCACTACATGCTGAAGCACCTGGTGTGGGCCAGCCGCGAGCT  
GGAGGGCTTCGCCCTGAACCCCGGCCTGCTGGAGACCGCCGAGGGCTGCAAGCAGATCATG  
AAGCAGCTGCAGCCCGCCCTGCAGACCGGCACCGAGGAGCTGCGCAGCCTGTACAACACCG  
TGGCCACCCTGTACTGCGTGACGCGGCATCGAGGTCCGCGACACCAAGGAGGCCCTTGA  
CAAGATCGAGGAGGAGCAGAACAAGTCCCAGCAGAAGACCCAGCAGGCCAAGGAGGCCGAC  
GGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAGG  
CCATCAGCCCCCGCACCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCC  
CGAGGTGATCCCCATGTTACCGCCCTGAGCGAGGGCGCCACCCCCCAGGACCTGAACACG  
ATGTTGAACACCGTGGGCGGCCACCAGGCCGCCATGCAGATGCTGAAGGACACCATCAACG  
AGGAGGCCGCGGAGTGGGACCGCCTGCACCCCGTGCAGGCCGCGCCCGTGGCCCCCGGCCA  
GATGCGCGACCCCCGCGGCAGCGACATCGCCGGCGCCACCAGCACCTGCAGGAGCAGATC  
GCCTGGATGACCAGCAACCCCCCGTGGCCGTGGGCGACATCTACAAGCGGTGGATCATCC  
TGGGCCTGAACAAGATCGTGCGGATGTACAGCCCCGTGAGCATCCTGGACATCCGCCAGGG  
CCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTGCGCGCCGAGCAG  
GCCACCCAGGACGTGAAGAAGTGGATGACCGAGACCCTGCTGGTGCAGAACGCCAACCCCG  
ACTGCAAGACCATCCTGCGCGCTCTCGGCCCCGGCGGCCACCCTGGAGGAGATGATGACCGC  
CTGCCAGGGCGTGGGCGGCCCGGCCACAAGGCCCGCGTGTGGCCGAGGCGATGAGCCAG  
GCCAACAGCGTGAACATCATGATGCAGAAGAGCAACTTCAAGGGCCCCCGGCGCAACGTCA  
AGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCAAGAAGTCCCGCGCCCCCGCAAGAA  
GGGCTGCTGGAAGTGCAGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCC  
AACTTCCTGGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCCGGCAACTTCCTGCAGAACC  
GCAGCGAGCCCGCCGCCCCCACCCTGCCCCACCGCCCCCCCCCGGAGAGCTTCCGCTTCGA  
GGAGACCACCCCGCCCCCAAGCAGGAGCCCAAGGACCGCGAGCCCTACCGCGAGCCCCTG  
ACCGCCCTGCGCAGCCTGTTTCGGCAGCGGCCCCCTGAGCCAGTAA

FIG. 2



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3/23

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--> signal peptide (1-81)  
ATGCGCGTGTGGGCATCCTGAAGAATAACCAGCAGTGGTGGATGTGGGGCATCCTGGGCTTCTGGATGCTGATCA  
TCAGCAGCGTGGTGGCAACCTGTGGGTGACCGTGTACTACGGCGTGCCCGTGTGGAAGGAGGCCAAGACCACCT  
GTTCTGCACCAGCGACGCCAAGGCCTACGAGACCGAGGTGCACAACGTGTGGGCCACCCACGCTGCGTGCCACCC  
GACCCCAACCCCCAGGAGATCGTGTGGAGAACGTGACCGAGAACTTCAACATGTGGAAGAACGACATGGTGGACC  
AGATGCACGAGGACATCATCAGCCTGTGGGACGAGCCTGAAGCCCTGCGTGAAGCTGACCCCCCTGTGCGTGAC  
CCTGAAGTGCCGCAACGTGAACGCCACCAACAACATCAACAGCATGATCGACAACAGCAACAAGGGCGAGATGAAG  
AACTGCAGCTTCAACGTGACCACCGAGTGCAGCGACCGCAAGCAGGAGGTGCACGCCCTGTTCTACCGCCTGGACG  
TGGTGGCCCTGCAGGGCAACAACAGCAACGAGTACCGCCTGATCAACTGCAACACCAGCGCCATCACCCAGGCCTG  
CCCCAAGGTGAGCTTCGACCCCATCCCCATCCACTACTGCACCCCCGCCGGCTACGCCATCCTGAAGTGCAACAAC  
CAGACCTTCAACGGCACCGGCCCTGCAACAACGTGAGCAGCGTGCAGTGCGCCACGGCATCAAGCCCGTGGTGA  
GCACCCAGCTGCTGCTGAACGGCAGCCTGGCCAAGGGCGAGATCATCATCCGACGCGAGAACCTGGCCAACAACGC  
CAAGATCATCATCGTGCAGCTGAACAAGCCCGTGAAGATCGTGTGCGTGCGCCCCAACAACAACACCCGCAAGAGC  
GTGCGCATCGGCCCGGCCAGACCTTCTACGCCACCGCGAGATCATCGCGACATCCGCCAGGCCTACTGCATCA  
TCAACAAGACCGAGTGAACAGCACCTGCAGGGCGTGAGCAAGAAGCTGGAGGAGCACTTCAAGCAAGAAGGCCAT  
CAAGTTCGAGCCAGCAGCGCGCGACCTGGAGATCACCAACACAGCTTCAACTGCCGCGCGAGTTCTTCTAC  
TGCGACACCCAGCCAGCTGTTCAACAGCACCTACAGCCCCAGCTTCAACGGCACCGAGAACAGCTGAACGGCACCA  
TCACCATCACCTGCCGCATCAAGCAGATCATCAACATGTGGCAGAAGGTGGGCCGCGCCATGTACGCCCCCCCCAT  
CGCCGGCAACCTGACCTGCGAGAGCAACATCACCGCCTGCTGCTGACCCGCGACGGCGGCAAGACCGGCCCAAC  
GACACCGAGATCTTCGCCCCGGCGGGCGGACATGCGCGACAACCTGGCGCAACGAGCTGTACAAGTACAAGGTGG  
TGGAGATCAAGCCCTGGGCGTGGCCCCACCGAGGCCAAGCGCGCGTGGTGGAGCGCGAGAAGCGCGCGCTGGG  
CATCGGCGCGTGTCTCTGGGCTTCTGGGCGCGCGCGGAGCACCATGGGCGCGCCAGCATCACCTGACCGTG  
CAGGCCCCGCTGCTGCTGAGCGGCATCGTGCAGCAGCAGAACAACCTGCTGCGCGCCATCGAGGCCCAGCAGCACC  
TGCTGCAGCTGACCGTGTGGGGCATCAAGCAGCTGCAGACCCGCATCCTGGCCGTGGAGCGCTACCTGAAGGACCA  
GCAGCTGCTGGGCATCTGGGGCTGCAGCGGCAAGCTGATCTGCACCACCGCCGTGCCCTGGAACAGCAGCTGGAGC  
AACCGCAGCCACGACGAGATCTGGGACAACATGACCTGGATGCAGTGGGACCGCGAGATCAACAACCTACACCGACA  
CCATCTACCGCCTGCTGGAGGAGAGCCAGAACCAGCAGGAGAAGAACGAGAAGGACCTGCTGGCCCTGGACAGCTG  
GCAGAACCTGTGGAAGTGGTTCAGCATCACCAACTGGCTGTGGTACATCAAGATCTTCATCATGATCGTGGGCGGC  
CTGATCGGCCTGCGCATCATCTTCGCGTGTGAGCATCGTGAACCGCGTGCGCCAGGGCTACAGCCCCCTGCCCT  
TCCAGACCTGACCCCAACCCCGGAGCCGACCGCCTGGGCCGATCGAGGAGGAGGGCGGCGAGCAGGACCG  
CGGCCGAGCATCCGCTGGTGGAGCGGCTTCTGGCCCTGGCCTGGGACGACCTGCGCAGCCTGTGCCTGTTTACG  
TACCACCGCCTGCGGACTTCATCCTGATCGCCGCCCGCGTGTGGAGCTGCTGGGCCAGCGCGGCTGGGAGGCCC  
TGAAGTACCTGGGCAGCCTGGTGCAGTACTGGGGCCTGGAGCTGAAGAAGAGCGCCATCAGCCTGCTGGACACCAT  
CGCCATCGCCGTGGCCGAGGGCACCGACCGCATCATCGAGTTTATCCAGCGCATCTGCCGCGCCATCCGCAACATC  
CCCCGCGCATCCGCCAGGGCTTCGAGGCCGCCCTGCAGTAA

FIG. 3



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4/23

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--> signal peptide (1-72) V/-->  
ATGCGCGTGCGCGGCATCCTGCGCAGCTGGCAGCAGTGGTGGATCTGGGGCATCCTGGGCTTCTGGATCTGCAGCG  
gp120/140/160 (72)  
GCCTGGGCAACCTGTGGGTGACCGTGTACGACGGCGTGCCCGTGTGGCGCGAGGCCAGCACCACCCTGTTCTGCGC  
CAGCGACGCCAAGGCCTACGAGAAGGAGGTGCACAACGTGTGGGCCACCCACGCCTGCGTGCCACCGACCCCAAC  
CCCCAGGAGATCGAGCTGGACAACGTGACCGAGAAGTTCAACATGTGGAAGAAGACATGGTGGACCAGATGCACG  
AGGACATCATCAGCCTGTGGGACCAGAGCCTGAAGCCCCGCGTGAAGCTGACCCCCCTGTGCGTGACCCTGAAGTG  
CACCAACTACAGCACCAACTACAGCAACACCATGAACGCCACCCAGCTACAACAACAACACCACCGAGGAGATCAAG  
AACTGCACCTTCAACATGACCACCGAGCTGCGCGACAAGAAGCAGCAGGTGTACGCCCTGTTCTACAAGCTGGACA  
TCGTGCCCCCTGAACAGCAACAGCAGCGAGTACCGCCTGATCAACTGCAACACCAGCGCCATCACCCAGGCCTGCC  
CAAGGTGAGCTTCGACCCCATCCCCATCCACTACTGCGCCCCCGCGGCTACGCCATCCTGAAGTGCAAGAACAAC  
ACCAGCAACGGCACCGGCCCTGCCAGAACGTGAGCACCGTGAGTGACCCACGGCATCAAGCCCGTGGTGAGCA  
CCCCCTGCTGCTGAACGGCAGCCTGGCCGAGGGCGGCGAGATCATCATCCGCGCAAGAACCTGAGCAACAACGC  
CTACACCATCATCGTGACCTGAACGACAGCGTGGAGATCGTGTGACCCGCCCCAACAACAACACCCGCAAGGGC  
ATCCGCATCGGCCCCGGCCAGACCTTCTACGCCACCGAGAACATCATCGGCGACATCCGCCAGGCCCCACTGCAACA  
TCAGCGCCGGCGAGTGGAAAGGCCGTGACGCGGTGAGCGCCAAGCTGCGCGAGCACTTCCCCAACAAGACCAT  
CGAGTTCAGCCCAGCAGCGGGCGGACCTGGAGATCACCAACACAGCTTCAACTGCCGCGGCGAGTTCTTCTAC  
TGCAACACCAGCAAGCTGTTCAACAGCAGCTACAACGGCACCAGCTACCGCGGCACCGAGAGCAACAGCAGCATCA  
TCACCCCTGCCCTGCCGCATCAAGCAGATCATCGACATGTGGCAGAAGGTGGGCCGCGCCATCTACGCCCCCCCCAT  
CGAGGGCAACATCACCTGCAGCAGCAGCATCACCGGCCTGCTGCTGGCCCGGACGGCGGCCTGGACAACATCACC  
ACCGAGATCTTCCGCCCCCAGGGCGGCGACATGAAGGACAACCTGGCGCAACGAGCTGTACAAGTACAAGGTGGTGG  
AGATCAAGCCCCCTGGGCGTGGCCCCCACCAGGGCCAAGCGCCGCGTGGTGGAGCGCGAGAAGCGCGCCGTGGGCAT  
CGGCGCCGTGATCTTCGGCTTCTTGGGCGCCGCGGCGAGCAACATGGGCGCCGCGCAGCATCACCTGACCGCCAG  
GCCCCCAGCTGCTGAGCGGCATCGTGCAGCAGCAGAGCAACCTGCTGCGCGCCATCGAGGCCAGCAGCATGC  
TGCAGCTGACCGTGTGGGGCATCAAGCAGCTGCAGGCCCGCGTGTGGCCATCGAGCGCTACCTGAAGGACCAGCA  
GCTGCTGGGCATCTGGGGCTGCAGCGGCAAGCTGATCTGCACCACCACCGTGCCCTGGAACAGCAGCTGGAGCAAC  
AAGACCCAGGGCGAGATCTGGGAGAACATGACCTGGATGCAGTGGGACAAGGAGATCAGCAACTACACCGGCATCA  
TCTACCGCCTGCTGGAGGAGAGCCAGAACCAGCAGGAGCAGAACGAGAAGGACCTGCTGGCCCTGGACAGCCGCAA  
CAACCTGTGGAGCTGGTTCAACATCAGCAACTGGCTGTGGTACATCAAGATCTTCATCATGATCGTGGGCGGCCTG  
ATCGCCCTGCGCATCATCTTCGCCGTGCTGAGCATCGTGAACCGCGTGCGCCAGGGCTACAGCCCCCTGAGCTTCC  
AGACCCCTGACCCCCAACCCCCGCGGCCTGGACCGCCTGGGCCGATCGAGGAGGAGGGCGGCGAGCAGGACCGCGA  
CCGAGCATCCGCCTGGTGCAGGGCTTCTTGGCCCTGGCCTGGGACGACCTGCGCAGCCTGTGCCTGTTTCACTAC  
CACCGCCTGCGCGACCTGATCCTGGTGACCGCCCGCGTGGTGGAGCTGCTGGGCCGAGCAGCCCCCGCGGCCTGC  
AGCGCGGCTGGGAGGCCCTGAAGTACCTGGGCAGCCTGGTGCAGTACTGGGGCCTGGAGCTGAAGAAGAGCGCCAC  
CAGCCTGCTGGACAGCATCGCCATCGCCGTGGCCGAGGGCACCGACCGCATCATCGAGGTGATCCAGCGCATCTAC  
CGCGCCTTCTGCAACATCCCCCGCGCGTGCGCCAGGGCTTCGAGGCCGCCCTGCAGTAA  
gp120 (1509) <--\--> (1510) gp41  
gp140 (2022) <--\-->  
gp160, gp41 (2565) <--\-->

FIG. 4



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5/23

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Gag\_AF110965\_BW\_opt  
ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGGCAAGCTGGACGCCTGGGAGCGCATCCGCCTGCGCCCCGG  
CGGCAAGAAGTGCTACATGATGAAGCACCTGGTGTGGGCCAGCCGCGAGCTGGAGAAGTTCGCCCTGAACC  
CCGGCCTGCTGGAGACCAGCGAGGGCTGCAAGCAGATCATCCGCCAGCTGCACCCCCGCCCTGCAGACCGGC  
AGCGAGGAGCTGAAGAGCCTGTTCAACACCGTGGCCACCCTGTACTGCGTGCACGAGAAGATCGAGGTGCG  
CGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGAGCAGAACAAAGAGCCAGCAGAAGATCCAGCAGGCCG  
AGGCCGCCGACAAGGGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCAC  
CAGGCCATCAGCCCCCGCACCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCCCGAGGT  
GATCCCCATGTTACCGCCCTGAGCGAGGGCGCCACCCCCAGGACCTGAACACCATGCTGAACACCGTGG  
GCGGCCACCAGGCCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCGCGTG  
CACCCCGTGCACGCCGGCCCCATCGCCCCGGCCAGATGCGCGAGCCCCGCGGCAGCGACATCGCCGGCAC  
CACCAGCACCTGCAGGAGCAGATCGCCTGGATGACCAGCAACCCCCCATCCCCGTGGGCGACATCTACA  
AGCGCTGGATCATCCTGGGCCTGAACAAGATCGTGCGCATGTACAGCCCCGTGAGCATCCTGGACATCAAG  
CAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAGCAGAGCAC  
CCAGGAGGTGAAGAACTGGATGACCGACACCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCC  
TGCGCGCCCTGGGCCCCGGCGCCAGCCTGGAGGAGATGATGACCGCCTGCCAGGGCGTGGGCGGCCCCAGC  
CACAAGGCCCCGCTGCTGGCCGAGGCGATGAGCCAGGCCAACACCAGCGTGATGATGCAGAAGAGCAACTT  
CAAGGGCCCCCGCGCATCGTGAAGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCCCGAACTGCCGCG  
CCCCCGCAAGAAGGGCTGCTGGAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAG  
GCCAACTTCTGGGCAAGATCTGGCCAGCCACAAGGGCCGCCCGGCAACTTCTGCAGAGCCGCCCCGA  
GCCACCGCCCCCCCCCGCCGAGAGCTTCCGCTTCGAGGAGACCACCCCGGCCAGAAGCAGGAGAGCAAGG  
ACCGCGAGACCCTGACCAGCCTGAAGAGCCTGTTTCGGCAACGACCCCTGAGCCAGTAA

FIG. 5



6/23

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Gag\_AF110967\_BW\_opt  
ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGAGAAGCTGGACAAGTGGGAGAAGATCCGCCTGCGCCCCGG  
CGGCAAGAAGCACTACATGCTGAAGCACCTGGTGTGGGCCAGCCGCGAGCTGGAGGGCTTCGCCCTGAACC  
CCGGCCTGCTGGAGACCGCCGAGGGCTGCAAGCAGATCATGAAGCAGCTGCAGCCCGCCCTGCAGACCGGC  
ACCGAGGAGCTGCGCAGCCTGTACAACACCGTGGCCACCCTGTACTGCGTGCACGCCGGCATCGAGGTGCG  
CGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGAGCAGAACAAGAGCCAGCAGAAGACCCAGCAGGCCA  
AGGAGGCCGACGGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAG  
GCCATCAGCCCCCGCACCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCCCGAGGTGAT  
CCCCATGTTACCGCCCTGAGCGAGGGCGCCACCCCCAGGACCTGAACAACATGCTGAACACCGTGGGCG  
GCCACCAGGCCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCGCCTGCAC  
CCCGTGCAGGCCGGCCCCGTGGCCCCCGGCCAGATGCGCGACCCCCCGGCAGCGACATCGCCGGCGCCAC  
CAGCACCTGCAGGAGCAGATCGCCTGGATGACCAGCAACCCCCCGTGCCCGTGGGCGACATCTACAAGC  
GCTGGATCATCCTGGGCCTGAACAAGATCGTGCGCATGTACAGCCCCGTGAGCATCCTGGACATCCGCCAG  
GGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAGCAGGCCACCCA  
GGACGTGAAGAACTGGATGACCGAGACCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCCTGC  
GCGCCCTGGGCCCCCGGCCACCCCTGGAGGAGATGATGACCGCCTGCCAGGGCGTGGGCGGCCCGGCCAC  
AAGGCCCCGCTGCTGGCCGAGGCATGAGCCAGGCCAACAGCGTGAACATCATGATGCAGAAGAGCAACTT  
CAAGGGCCCCCGCGCAACGTGAAGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCAAGAAGTGC CGC  
CCCCCGCAAGAAGGGCTGCTGGAAGTGGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAG  
GCCAACTTCTGGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCGGCAACTTCTGCAGAACCGCAGCGA  
GCCC GCCGCCCCACCGTGCCACCGCCCCCCCCCGCCGAGAGCTTCCGCTTCGAGGAGACCACCCCGCCC  
CCAAGCAGGAGCCCAAGGACCGCGAGCCCTACCGCGAGCCCCTGACCGCCCTGCGCAGCCTGTTCCGGCAGC  
GGCCCCCTGAGCCAGTAA

FIG. 6

7/23

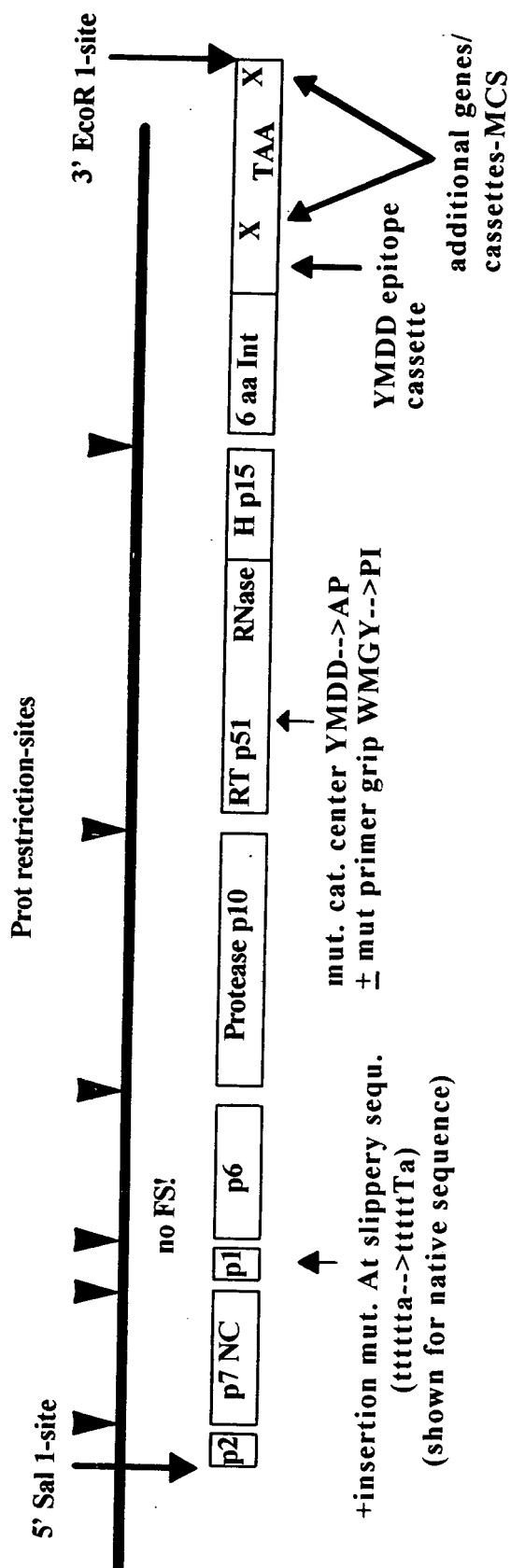


FIG. 7



8/23

PR975(+) (SEQ ID NO:30)

GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCCGAACTGCCGCGCCCCCGCAAGAAGGGCTGCTGGAAGT  
GCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCCAGGGCAAGGCCCGCGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGAGCTGCAGGTGCGCGGCGACAACCCCCGCA  
GCGAGGCCGCGCGCCGAGCGCCAGGGCACCTGAACTTCCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGCCCTGCTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCCGT  
GAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCCTGAACTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCGGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCCGAGAACCCCTACAACAC  
CCCCGTGTTCCGCATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCC  
ACCCCGCCGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGGAGCCCTTC  
CGCGCCCCGCAACCCCGAGATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGC  
AGCGACCTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCT  
GCTGCGCTGGGGCTTCACCACCCCCGACAAGAAGCACCAAGAGAGCCCCCTTCTCT  
GTGGATGGGCTACGAGCTGCACCCCCGACAAGTGGACCGTGACGCCATCGAGCTGCC  
CGAGAAGGAGAGCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACT  
GGCCAGCCAGATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCG  
GCGCCAAGGCCCTGACCGACATCGTGCCCCCTGACCGAGGAGGCCGAGCTGGAGCTG  
GCCGAGAACCGCGAGATCCTGCGCGAGCCCGTGACGGCGTGTACTACGACCCAG  
CAAGGACCTGGTGGCCGAGATCCAGAAGCAGGGCCACGACCAGTGGACCTACCAGA  
TCTACCAGGAGCCCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACC  
GCCCCACCAACGACGTGAAGCAGCTGACCGAGGCCGTGACAGAAGATCGCCATGGA  
GAGCATCGTGATCTGGGGCAAGACCCCCAAGTTCCGCTGCCCATCCAGAAGGAGAC  
CTGGGAGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTT  
CGTGAACACCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCAT  
CGGCGCCGAGACCTTCTACGTGGACGGCGCCGCAACCGCGAGACCAAGATCGGCA  
AGGCCGGCTACGTGACCGACCGGGGCGGCAGAAGATCGTGAGCCTGACCGAGACC  
ACCAACCAGAAGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAG  
CGAGGTGAACATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCAGCC  
CGACAAGAGCGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGG  
AGAAGGTGTACCTGAGCTGGGTGCCCCGCCACAAGGGCATCGGCGGCAACGAGCAG  
ATCGACAAGCTGGTGAGCAAGGGCATCCGCAAGGTGCTGTTCTGGACGGCATCGAT  
GGCGGCATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGCGAGCGGCGCCCT  
AGGATCGATTAAAAGCTTCCCGGGGCTAGCACCGGTGAATTC

FIG. 8





9/23

PR975YM (SEQ ID NO:31)

GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCCGAACTGCCGCGCCCCCGCAAGAAGGGGTGCTGGAAGT  
GCGGCAAGGAGGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCAGGGCAAGGCCCGCGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGAGCTGCAGGTGCGCGGCGACAACCCGCCGA  
GCGAGGCCGCGCGCCGAGCGCCAGGGCACCTGAACTTCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGCCCTGTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCGT  
GAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCTGAACTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCGGAGAACCCCTACAACAC  
CCCCGTGTTCCGCATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCC  
ACCCCGCCGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGGAGCCCTTC  
CGCGCCCGCAACCCCGAGATCGTGATCTACCAGGCCCCCTGTACGTGGGCGAGCGAC  
CTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCTGTGCG  
CTGGGGCTTACCAACCCCGACAAGAAGCACCAAGGAGCCCCCTTCTGTGGAT  
GGGCTACGAGCTGCACCCCGACAAGTGACCGTGACGCCATCGAGCTGCCCCGAGA  
AGGAGAGCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACTGGGCC  
AGCCAGATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCGGCGCC  
AAGGCCCTGACCGACATCGTGCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCCGA  
GAACCGCGAGATCCTGCGCGAGCCCGTGACGGCGTGTACTACGACCCAGCAAGG  
ACCTGGTGGCCGAGATCCAGAAGCAGGGCCACGACCAGTGGACCTACCAGATCTAC  
CAGGAGCCCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACCGCCCA  
CACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCATGGAGAGCA  
TCGTGATCTGGGGCAAGACCCCAAGTTCCGCCTGCCATCCAGAAGGAGACCTGGG  
AGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCTGTGA  
ACACCCCCCTTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCATCGGCG  
CCGAGACCTTCTACGTGGACGGCGCCGCCAACCGCGAGACCAAGATCGGCAAGGCC  
GGCTACGTGACCGACCGGGGCGGCGAGAAGATCGTGAGCCTGACCGAGACCACAA  
CCAGAAGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAGCGAGG  
TGAACATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACA  
AGAGCGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAG  
GTGTACCTGAGCTGGGTGCCCCGCCACAAGGGCATCGGCGGCAACGAGCAGATCGA  
CAAGCTGGTGAAGGAGCATCCGCAAGGTGCTGTTCTTGGACGGCATCGATGGCG  
GCATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGCGAGCGGCGGCCCTAGGA  
TCGATTAAGGCTTCCCGGGGCTAGCACCGGTGAATTG

FIG. 9



10/23

PR975YMWM (SEQ ID NO:32)

GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAAGGGGTGCTGGAAGT  
GCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCCAGGGCAAGGCCCGGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGAGCTGCAGGTGCGCGGCGACAACCCCCGCA  
GCGAGGCCCGGCGCCGAGCGCCAGGGCACCTGAACTTCCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGGCCCTGCTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCCGT  
GAACATCATCGGCGGCAACATGCTGACCCAGCTGGGCTGCACCCTGAACTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCGGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCCGAGAACCCCTACAACAC  
CCCCGTGTTCCGATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCC  
ACCCCGCCGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGAGCCCTTC  
CGCGCCCCGCAACCCCGAGATCGTGATCTACCAGGCCCCCCTGTACGTGGGCGACGAC  
CTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCTGTGCG  
CTGGGGCTTACCACCCCCGACAAGAAGCACCAAGGAGCCCCCCTTCTGCCCCAT  
CGAGCTGCACCCCGACAAGTGGACCGTGACGCCATCGAGCTGCCCGAGAAGGAGA  
GCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACTGGGCCAGCCAG  
ATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCGGCGCCAAGGCC  
CTGACCGACATCGTGCCCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCCGAGAACCG  
CGAGATCCTGCGCGAGCCCCGTGCACGGCGTGTACTACGACCCCGAGCAAGGACCTGGT  
GGCCGAGATCCAGAAGCAGGGCCACGACCAAGTGGACCTACCAGATCTACCAGGAGC  
CCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACCGCCACACCAAC  
GACGTGAAGCAGCTGACCGAGGCGGTGCAGAAGATCGCCATGGAGAGCATCGTGAT  
CTGGGGCAAGACCCCCAAGTTCCGCTGCCCATCCAGAAGGAGACCTGGGAGACCT  
GGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGAACACCC  
CCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCATCGGCGCCGAG  
ACCTTCTACGTGGACGGCGCCGCCAACC GCGAGACCAAGATCGGCAAGGCCGGCTA  
CGTGACCGACCGGGGCGCGCAGAAGATCGTGAGCCTGACCGAGACCACCAACCAGA  
AGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAGCGAGGTGAAC  
ATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACAAGAG  
CGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAGGTGT  
ACCTGAGCTGGGTGCCCGCCACAAGGGCATCGGCGGCAACGAGCAGATCGACAAG  
CTGGTGAGCAAGGGCATCCGCAAGGTGCTGTTCTTGACGGCATCGATGGCGGCATC  
GTGATCTACCAGTACATGGACGACCTGTACGTGGGCAGCGGCGGCCCTAGGATCGAT  
TAAAGCTTCCCGGGGCTAGCACCGGTGAATTC

FIG. 10



11/23

8\_5\_ZA (SEQ ID NO:33)

1 TGG AAGGGTT AATTTACTCC AAGAAAAGGC AAGAAATCCT TGATTGTGG GTCTATCACA  
61 CACAAGGCTT CTTCCCTGAT TGGCAAAACT ACACACCGGG GCCAGGGGTC AGATATCCAC  
121 TGACCTTTGG ATGGTGCTAC AAGCTAGTGC CAGTTGACCC AGGGGAGGTG GAAGAGGCCA  
181 ACGGAGGAGA AGACAACTGT TTGCTACACC CTATGAGCCA ACATGGAGCA GAGGATGAAG  
241 ATAGAGAAGT ATTAAGTGG AAGTTTGACA GCCTCCTAGC ACGCAGACAC ATGGCCCGCG  
301 AGCTACATCC GGAGTATTAC AAAGACTGCT GACACAGAAG GGACTTTCCG CCTGGGACTT  
361 TCCACTGGGG CGTTCGGGA GGTGTGGTCT GGGCGGGACT TGGGAGTGGT CAACCCTCAG  
421 ATGCTGCATA TAAGCAGCTG CTTTTGCGCT GTACTGGGTC TCTCTCGGTA GACCAGATCT  
481 GAGCCTGGGA GCCCTCTGGC TATCTAGGGA ACCCACTGCT TAAGCCTCAA TAAAGCTTGC  
541 CTTGAGTGCT TTAAGTAGTG TGTGCCATC TGTTGTGTGA CTCTGGTAAC TAGAGATCCC  
601 TCAGACCCTT TGTGGTAGTG TGGAAAATCT CTAGCAGTGG CGCCCGAACA GGGACCAGAA  
661 AGTGAAAGTG AGACCAGAGG AGATCTCTCG ACGCAGGACT CGGCTTGCTG AAGTGCACAC  
721 GGCAAGAGGC GAGAGGGGCG GCTGGTGAGT ACGCCAATTT TACTTGACTA GCGGAGGCTA  
781 GAAGGAGAGA GATGGGTGCG AGAGCGTCAA TATTAAGCGG CGGAAAATTA GATAAATGGG  
841 AAAGAATTAG GTTAAGGCCA GGGGGAAAGA AACATTATAT GTTAAACAT CTAGTATGGG  
901 CAAGCAGGGA GCTGGAAAGA TTTGCACTTA ACCCTGGCCT GTTAGAAACA TCAGAAGGCT  
961 GTAAACAAAT AATAAACAG CTACAACCAG CTCTTCAGAC AGGAACAGAG GAACTTAGAT  
1021 CATTATTCAA CACAGTAGCA ACTCTCTATT GTGTACATAA AGGGATAGAG GTACGAGACA  
1081 CCAAGGAAGC CTTAGACAAG ATAGAGGAAG AACAAAACAA ATGTCAGCAA AAAGCACAAAC  
1141 AGGCAAAAGC AGCTGACGAA AAGGTCAGTC AAAATTATCC TATAGTACAG AATGCCCAAG  
1201 GGCAAATGGT ACACCAAGCT ATATCACCCTA GAACATTGAA TGCATGGATA AAAGTAATAG  
1261 AGGAAAAGGC TTTCATCCA GAGGAAATAC CCATGTTTAC AGCATTATCA GAAGGAGCCA  
1321 CCCCACAAGA TTAAACACA ATGTTAAATA CAGTGGGGGG ACATCAAGCA GCCATGCAAA  
1381 TGTTAAAGA TACCATCAAT GAGGAGGCTG CAGAATGGGA TAGGACACAT CCAGTACATG  
1441 CAGGGCCTGT TGCACCAGGC CAGATGAGAG AACCAGGGG AAGTGACATA GCAGGAAGTA  
1501 CTAGTACCCT TCAGGAACAA ATAGCATGGA TGACAAGTAA TCCACCTATT CCAGTAGAAG  
1561 ACATCTATAA AAGATGGATA ATTCTGGGGT TAAATAAAAT AGTAAGAATG TATAGCCCTG  
1621 TTAGCATTTT GGACATAAAA CAAGGGCCAA AAGAACCCTT TAGAGACTAT GTAGACCGGT  
1681 TCTTTAAAC CTTAAGAGCT GAACAAGCTA CACAAGATGT AAAGAATTGG ATGACAGACA  
1741 CCTTGTTGGT CCAAAATGCG AACCAGATT GTAAGACCAT TTTAAGAGCA TTAGGACCAG  
1801 GGGCTCATT AGAAGAAATG ATGACAGCAT GTCAGGGAGT GGGAGGACCT AGCCATAAAG  
1861 CAAGAGTGTT GGCTGAGGCA ATGAGCCAAG CAAACAGTAA CATACTAGTG CAGAGAAGCA  
1921 ATTTAAAGG CTCTAACAGA ATTATTAAAT GTTTCAACTG TGGCAAAGTA GGGCACATAG  
1981 CCAGAAAATG CAGGGCCCCT AGGAAAAAGG GCTGTTGGAA ATGTGGACAG GAAGGACACC  
2041 AAATGAAAGA CTGTACTGAG AGGCAGGCTA ATTTTTAGG GAAAATTTGG CCTTCCACA  
2101 AGGGGAGGCC AGGGAATTTC CTCCAGAACA GACCAGAGCC AACAGCCCCA CCAGCAGAAC  
2161 CAACAGCCCC ACCAGCAGAG AGCTTCAGGT TCGAGGAGAC AACCCTCGTG CCGAGGAAGG  
2221 AGAAAGAGAG GGAACCTTTA ACTTCCCTCA AATCACTCTT TGGCAGCGAC CCCTTGCTC  
2281 AATAAAAGTA GAGGGCCAGA TAAAGGAGGC TCTCTTAGAC ACAGGAGCAG ATGATACAGT  
2341 ATTAGAAGAA ATAGATTGTC CAGGGAAATG GAAACCAAAA ATGATAGGGG GAATTGGAGG  
2401 TTTTATCAAA GTAAGACAGT ATGATCAAAT ACTTATAGAA ATTTGTGGAA AAAAGGCTAT  
2461 AGGTACAGTA TTAGTAGGGC CTACACCAGT CAACATAATT GGAAGAAATC TGTTAACTCA  
2521 GCTTGATGTC AACTAAATT TTCCAATTAG TCCTATTGAA ACTGTACCAG TAAATTTAAA  
2581 ACCAGGAATG GATGGCCCAA AGGTCAAACA ATGGCCATTG ACAGAAGAAA AAATAAAGC  
2641 ATTAACAGCA ATTTGTGAGG AAATGGAGAA GGAAGGAAAA ATTACAAAAA TTGGGCCTGA  
2701 TAATCCATAT AACACTCCAG TATTTGCCAT AAAAAAGAAG GACAGTACTA AGTGGAGAAA  
2761 ATTAGTAGAT TTCAGGGAAC TCAATAAAAG AACTCAAGAC TTTTGGGAAG TTCAATTAGG  
2821 AATACCACAC CCAGCAGGAT TAAAAAGAA AAAATCAGTG ACAGTGCTAG ATGTGGGGGA  
2881 TGCATATTTT TCAGTTCCTT TAGATGAAAG CTTCAGGAAA TATACTGCAT TCACCATACC

FIG. 11A



12/23

2941 TAGTATAAAC AATGAAACAC CAGGGATTAG ATATCAATAT AATGTGCTGC CACAGGGATG  
3001 GAAAGGATCA CCAGCAATAT TCCAGAGTAG CATGACAAAA ATCTTAGAGC CCTTCAGAGC  
3061 AAAAAATCCA GACATAGTTA TCTATCAATA TATGGATGAC TTGTATGTAG GATCTGACTT  
3121 AGAAATAGGG CAACATAGAG CAAAAATAGA AGAGTTAAGG GAACATTTAT TGAAATGGGG  
3181 ATTTACAACA CCAGACAAGA AACATCAAAA AGAACCCCCA TTTCTTTTGA TGGGGTATGA  
3241 ACTCCATCCT GACAAATGGA CAGTACAACC TATACTGCTG CCAGAAAAGG ATAGTTGGAC  
3301 TGTCAATGAT ATACAGAAGT TAGTGGGAAA ATTAAACTGG GCAAGTCAGA TTTACCCAGG  
3361 GATTAAAGTA AGGCAACTCT GTAAACTCCT CAGGGGGGCC AAAGCACTAA CAGACATAGT  
3421 ACCACTAAGT GAAGAAGCAG AATTAGAATT GGCAGAGAAC AGGGAAATTT TAAGAGAACC  
3481 AGTACATGGA GTATATTATG ATCCATCAAA AGACTTGATA GCTGAAATAC AGAAACAGGG  
3541 GCATGAACAA TGGACATATC AAATTTATCA AGAACCATTT AAAAATCTGA AAACAGGGAA  
3601 GTATGCAAAA ATGAGGACTA CCCACACTAA TGATGTAAAA CAGTTAACAG AGGCAGTGCA  
3661 AAAAAATAGCC ATGGAAAGCA TAGTAATATG GGGAAAGACT CCTAAATTTA GACTACCCAT  
3721 CCAAAAAGAA ACATGGGAGA CATGGTGGAC AGACTATTGG CAAGCCACCT GGATCCCTGA  
3781 GTGGGAGTTT GTTAATACCC CTCCCCTAGT AAAATTATGG TACCAACTAG AAAAGATCC  
3841 CATAGCAGGA GTAGAAACTT TCTATGTAGA TGGAGCAACT AATAGGGAAG CTAAAAAGG  
3901 AAAAGCAGGG TATGTTACTG ACAGAGGAAG GCAGAAAATT GTTACTCTAA CTAACACAAC  
3961 AAATCAGAAG ACTGAGTTAC AAGCAATTCA GCTAGCTCTG CAGGATTTCAG GATCAGAAGT  
4021 AAACATAGTA ACAGACTCAC AGTATGCATT AGGAATCATT CAAGCACAAC CAGATAAGAG  
4081 TGAATCAGAG ATATTTAACC AAATAATAGA ACAGTTAATA AACAAGGAAA GAATCTACCT  
4141 GTCATGGGTA CCAGCACATA AAGGAATTGG GGGAAATGAA CAAGTAGATA AATTAGTAAG  
4201 TAAGGGAATT AGGAAAGTGT TGTCTCTAGA TGGAATAGAT AAAGCTCAAG AAGAGCATGA  
4261 AAGGTACCAC AGCAATTGGA GAGCAATGGC TAATGAGTTT AATCTGCCAC CCATAGTAGC  
4321 AAAAGAAATA GTAGCTAGCT GTGATAAATG TCAGCTAAAA GGGGAAGCCA TACATGGACA  
4381 AGTCGACTGT AGTCCAGGGA TATGGCAATT AGATTGTACC CATTTAGAGG GAAAAATCAT  
4441 CCTGGTAGCA GTCCATGTAG GTCCATGGCTA CATGGAAGCA GAGGTTATCC CAGCAGAAAC  
4501 AGGACAAGAA ACAGCATATT TTATATTAAA ATTAGCAGGA AGATGGCCAG TCAAAGTAAT  
4561 ACATACAGAC AATGGCAGTA ATTTTACCAG TACTGCAGTT AAGGCAGCCT GTTGGTGGGC  
4621 AGGTATCCAA CAGGAATTTG GAATTCCTTA CAATCCCCAA AGTCAGGGAG TGGTAGAATC  
4681 CATGAATAAA GAATTAAAGA AAATAATAGG ACAAGTAAGA GATCAAGCTG AGCACCTTAA  
4741 GACAGCAGTA CAAATGGCAG TATTCATTCA CAATTTTAAA AGAAAAGGGG GAATTGGGGG  
4801 GTACAGTGCA GGGGAAAGAA TAATAGACAT AATAGCAACA GACATACAAA CTAAAGAATT  
4861 ACAAAAACAA ATTATAAGAA TTCAAAATTT TCGGGTTTAT TACAGAGACA GCAGAGACCC  
4921 TATTTGGAAG GGACCAGCCG AACTACTCTG GAAAGGTGAA GGGGTAGTAG TAATAGAAGA  
4981 TAAAGGTGAC ATAAAGGTAG TACCAAGGAG GAAAGCAAAA ATCATTAGAG ATTATGGAAG  
5041 ACAGATGGCA GGTGCTGATT GTGTGGCAGG TGGACAGGAT GAAGATTAGA GCATGGAATA  
5101 GTTTAGTAAA GCACCATATG TATATATCAA GGAGAGCTAG TGGATGGGTC TACAGACATC  
5161 ATTTTGAAAG CAGACATCCA AAAGTAAGTT CAGAAGTACA TATCCCATTA GGGGATGCTA  
5221 GATTAGTAAT AAAACATAT TGGGGTTTGC AGACAGGAGA AAGAGATTGG CATTGTTGGT  
5281 ATGGAGTCTC CATAGAATGG AGACTGAGAG AATACAGCAC ACAAGTAGAC CCTGACCTGG  
5341 CAGACCAGCT AATTCACATG CATTATTTTG ATTGTTTTTAC AGAATCTGCC ATAAGACAAG  
5401 CCATATTAGG ACACATAGTT TTTCTAGGT GTGACTATCA AGCAGGACAT AAGAAGGTAG  
5461 GATCTCTGCA ATACTTGGCA CTGACAGCAT TGATAAAACC AAAAAAGAGA AAGCCACCTC  
5521 TGCCTAGTGT TAGAAAATTA GTAGAGGATA GATGGAACGA CCCCAGAAG ACCAGGGGCC  
5581 GCAGAGGGAA CCATACAATG AATGGACACT AGAGATTCTA GAAGAATCTA AGCAGGAAGC  
5641 TGTCAGACAC TTTCTAGAC CATGGCTCCA TAGCTTAGGA CAATATATCT ATGAAACCTA  
5701 TGGGGATACT TGGACGGGAG TTGAAGCTAT AATAAGAGTA CTGCAACAAC TACTGTTTCAT  
5761 TCATTTGAGA ATTGGATGCC AACATAGCAG AATAGGCATC TTGCGACAGA GAAGAGCAAG  
5821 AAATGGAGCC AGTAGATCCT AAATAAAGC CCTGGAACCA TCCAGGAAGC CAACCTAAAA  
5881 CAGCTTGTA TAATTGCTTT TGCAAACACT GTAGCTATCA TTGTCTAGTT TGCTTTCAGA

FIG. 11B



13/23

5941 CAAAAGGTTT AGGCATTTCC TATGGCAGGA AGAAGCGGAG ACAGCGACGA AGCGCTCCTC  
6001 CAAGTGGTGA AGATCATCAA AATCCTCTAT CAAAGCAGTA AGTACACATA GTAGATGTAA  
6061 TGGTAAGTTT AAGTTTATTT AAAGGAGTAG ATTATAGATT AGGAGTAGGA GCATTGATAG  
6121 TAGCAATAAT CATAGCAATA ATAGTGTGGA CCATAGCATA TATAGAATAT AGGAAATTGG  
6181 TAAGACAAAA GAAAATAGAC TGGTTAATTA AAAGAATTAG GGAAAGAGCA GAAGACAGTG  
6241 GCAATGAGAG TGATGGGGAC ACAGAAAGAT TGTCAACAAT GGTGGATATG GGGCATCTTA  
6301 GGCTTCTGGA TGCTAATGAT TTGTAACACG GAGGACTTGT GGGTCACAGT CTACTATGGG  
6361 GTACCTGTGT GGAGAGAAGC AAAAACTACT CTATTCTGTG CATCAGATGC TAAAGCATAT  
6421 GAGACAGAAG TGCATAATGT CTGGGCTACA CATGCTTGTG TACCCACAGA CCCCACCCCA  
6481 CAAGAAATAG TTTTGGGAAA TGTAACAGAA AATTTTAATA TGTGGAAAAA TAACATGGCA  
6541 GATCAGATGC ATGAGGATAT AATCAGTTTA TGGGATCAAA GCCTAAAGCC ATGTGTAAAG  
6601 TTGACCCAC TCTGTGTCAC TTTAACTGT ACAGATACAA ATGTTACAGG TAATAGAAGT  
6661 GTTACAGGTA ATACAAATGA TACCAATATT GCAAATGCTA CATATAAGTA TGAAGAAATG  
6721 AAAAATTGCT CTTTCAATGC AACCACAGAA TTAAGAGATA AGAAACATAA AGAGTATGCA  
6781 CTCTTTTATA AACTTGATAT AGTACCACTT AATGAAAATA GTAACAACTT TACATATAGA  
6841 TTAATAAATT GCAATACCTC AACCATAACA CAAGCCTGTC CAAAGGTCTC TTTTGACCCG  
6901 ATTCTTATAC ATTACTGTGC TCCAGCTGAT TATGCGATTG TAAAGTGTA TAATAAGACA  
6961 TTCAATGGGA CAGGACCATG TTATAATGTC AGCACAGTAC AATGTACACA TGGAATTAAG  
7021 CCAGTGGTAT CAACTCAACT ACTGTAAAT GGTAGTCTAG CAGAAGAAGG GATAATAATT  
7081 AGATCTGAAA ATTTGACAGA GAATACCAA ACAATAATAG TACATCTTAA TGAATCTGTA  
7141 GAGATTAATT GTACAAGGCC CAACAATAAT ACAAGGAAAA GTGTAAGGAT AGGACCAGGA  
7201 CAAGCATTCT ATGCAACAAA TGACGTAATA GGAACATAA GACAAGCACA TTGTAACATT  
7261 AGTACAGATA GATGGAATAA AACTTTACAA CAGGTAATGA AAAAATTAGG AGAGCATTTT  
7321 CCTAATAAAA CAATAAAATT TGAACCACAT GCAGGAGGGG ATCTAGAAAT TACAATGCAT  
7381 AGCTTTAATT GTAGAGGAGA ATTTTCTAT TGCAATACAT CAAACCTGTT TAATAGTACA  
7441 TACTACCCTA AGAATGGTAC ATACAAATAC AATGGTAATT CAAGCTTACC CATCAGACTC  
7501 CAATGCAAAA TAAACAAAT TGTACGCATG TGGCAAGGGG TAGGACAAGC AATGTATGCC  
7561 CCTCCCATTG CAGGAAACAT AACATGTAGA TCAAACATCA CAGGAATACT ATTGACACGT  
7621 GATGGGGGAT TTAACAACAC AAACAACGAC ACAGAGGAGA CATTCAGACC TGGAGGAGGA  
7681 GATATGAGGG ATAAGTGGAG AAGTGAATTA TATAAATATA AAGTGGTAGA AATTAAGCCA  
7741 TTGGGAATAG CACCCACTAA GGCAAAAAGA AGAGTGGTGC AGAGAAAAAA AAGAGCAGTG  
7801 GGAATAGGAG CTGTGTTCTT TGGGTTCTTG GGAGCAGCAG GAAGCACTAT GGGCGCAGCG  
7861 TCAATAACGC TGACGGTACA GGCCAGACAA CTGTTGTCTG GTATAGTGCA ACAGCAAAGC  
7921 AATTTGCTGA AGGCTATAGA GGCAGAACAG CATATGTTGC AACTCACAGT CTGGGGCATT  
7981 AAGCAGTCC AGGCGAGAGT CCTGGCTATA GAAAGATACC TAAAGGATCA ACAGCTCCTA  
8041 GGGATTTGGG GCTGCTCTGG AAGACTCATG TGCACCACTG CTGTGCCTTG GAACTCCAGT  
8101 TGGAGTAATA AATCTGAAGC AGATAATTGG GATAACATGA CTTGGATGCA GTGGGATAGA  
8161 GAAATTAATA ATTACACAGA AACAAATATC AGGTTGCTTG AAGACTCGCA AAACCAGCAG  
8221 GAAAAGAATG AAAAAGATTT ATTAGAATTG GACAAAGTGA ATAATCTGTG GAATTGGTTT  
8281 GACATATCAA ACTGGCTGTG GTATATAAAA ATATTCATAA TGATAGTAGG AGGCTTGATA  
8341 GGTTTAAGAA TAATTTTTCG TGTGCTCTCT ATAGTGAATA GAGTTAGGCA GGGATACTCA  
8401 CCTTTGTCAT TTCAGACCCT TACCCCAAGC CCGAGGGGAC TCGACAGGCT CGGAGGAATC  
8461 GAAGAAGAAG GTGGAGAGCA AGACAGAGAC AGATCCATAC GATTGGTGAG CGGATTCTTG  
8521 TCGCTTGCCT GGGACGATCT GCGGAGCCTG TGCTCTTCA GCTACCACCG CTTGAGAGAC  
8581 TTCATATTAA TTGCAGTGAG GGCAGTGGA CTCTGGGAC ACAGCAGTCT CAGGGGACTA  
8641 CAGAGGGGGT GGGAGATCCT TAAGTATCTG GGAAGTCTTG TGCAGTATTG GGGTCTAGAG  
8701 CTAAAAAAGA GTGCTATTAG TCCGCTTGAT ACCATAGCAA TAGCAGTAGC TGAAGGAACA  
8761 GATAGGATTA TAGAATTGGT ACAAAGAATT TGTAGAGCTA TCCTCAACAT ACCTAGGAGA  
8821 ATAAGACAGG GCTTTGAAGC AGCTTTGCTA TAAAATGGGA GGCAAGTGGT CAAAACGCAG  
8881 CATAGTTGGA TGGCCTGCAG TAAGAGAAAG AATGAGAAGA ACTGAGCCAG CAGCAGAGGG  
8941 AGTAGGAGCA GCGTCTCAAG ACTTAGATAG ACATGGGGCA CTTACAAGCA GCAACACACC

FIG. 11C



14/23

9001 TGCTACTAAT GAAGCTTG TG CCTGGCTGCA AGCACAAGAG GAGGACGGAG ATGTAGGCTT  
9061 TCCAGTCAGA CCTCAGGTAC CTTTAAGACC AATGACTTAT AAGAGTGCAG TAGATCTCAG  
9121 CTTCTTTTTTA AAAGAAAAGG GGGGACTGGA AGGGTTAATT TACTCTAGGA AAAGGCAAGA  
9181 AATCCTTGAT TTGTGGGTCT ATAACACACA AGGCTTCTTC CCTGATTGGC AAAACTACAC  
9241 ATCGGGGCCA GGGGTCCGAT TCCCACTGAC CTTTGGATGG TGCTTCAAGC TAGTACCAGT  
9301 TGACCCAAGG GAGGTGAAAG AGGCCAATGA AGGAGAAGAC AACTGTTTGC TACACCCTAT  
9361 GAGCCAACAT GGAGCAGAGG ATGAAGATAG AGAAGTATTA AAGTGGAAGT TTGACAGCCT  
9421 TCTAGCACAC AGACACATGG CCCGCGAGCT ACATCCGGAG TATTACAAAG ACTGCTGACA  
9481 CAGAAGGGAC TTTCCGCCTG GGACTTTCCA CTGGGGCGTT CCGGGAGGTG TGGTCTGGGC  
9541 GGGACTTGGG AGTGGTCACC CTCAGATGCT GCATATAAGC AGCTGCTTTT CGCTTGTA  
9601 GGGTCTCTCT CGGTAGACCA GATCTGAGCC TGGGAGCTCT CTGGCTATCT AGGGAACCCA  
9661 CTGCTTAGGC CTCAATAAAG CTTGCCTTGA GTGCTCTAAG TAGTGTGTGC CCATCTGTTG  
9721 TGTGACTCTG GTAAC TAGAG ATCCCTCAGA CCCTTTGTGG TAGTGTGGAA AATCTCTAGC  
9781 A

FIG. 11D



15/23

**RECEIVED**  
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TECH CENTER 1600/2900

SEQ ID NO:34

GCTGAGGCAATGAGCCAAGCAACCAGCGCAAACATACTGATGCAGAGAAGCAATTT  
CAAAGGCCCTAAAAGAATTATTAAATGTTTCAACTGTGGCAAGGAAGGGCACATAG  
CTAGAAATTGTAGGGCCCCTAGGAAAAAAGGCTGTTGGAAATGTGGAAAGGAAGGA  
CACCAAATGAAAGACTGTACTGAGAGGCAGGCTAA

**FIG. 12**



16/23

975Pol wt until 6aa Int: (SEQ ID NO:35)

TTTTTTAGGGAAGATTTGGCCTTCCCACAAGGGAAGGCCAGGGAATTTCTTCAGAA  
CAGAACAGAGCCAACAGCCCCACCAGCAGAGAGCTTCAAGTTCGAGGAGACAACCC  
CCGCTCCGAAGCAGGAGCCGAAAGACAGGGAACCTTAATTTCCCTCAAATCACTCT  
TTGGCAGCGACCCCTTGTCTCAATAAAAAGTAGGGGGTCAAATAAAGGAGGCTCTCTT  
AGACACAGGAGCTGATGATACAGTATTAGAAGAAATGAGTTTGCCAGGAAAATGGA  
AACCAAAAATGATAGGAGGAATTGGAGGTTTTATCAAAGTAAGACAGTATGATCAA  
ATACTTATAGAAATTTGTGGAAGGCTATAGGTACAGTATTAATAGGACCTACA  
CCTGTCAACATAATTGGAAGGAATATGTTGACTCAGCTTGGATGCACACTAAATTTT  
CCAATTAGTCCCATTGAAACTGTGCCAGTAAAATTAAGCCAGGAATGGATGGCCCA  
AAGGTTAAACAATGGCCATTGACAGAAGAGAAAAATAAAGCATTAAACAGCAATTTG  
TGAAGAAATGGAGAAAGAAGGAAAAATTACAAAAATTGGGCCTGAAAATCCATATA  
ACACTCCAGTATTTGCCATAAAAAAGAAGGACAGTACTAAGTGGAGAAAGTTAGTA  
GATTTTCAGGGAACCTTAATAAAAGAACTCAAGACTTTTGGGAAGTTCAATTAGGAATA  
CCACACCCAGCAGGGTTAAAAAAGAAAAAATCAGTGACAGTACTGGATGTGGGGGA  
TGCATATTTTTTCAGTTCCTTTAGATGAGGACTTCAGGAAATATACTGCATTACCAT  
CCTAGTATAACAATGAAACACCAGGGATTAGATATCAATATAATGTGCTTCCACAG  
GGATGGAAAGGATCACCATCAATATTCAGAGTAGCATGACAAAAATCTTAGAGCC  
CTTTAGAGCAAGAAATCCAGAAATAGTCATCTATCAATATATGGATGACTTGTATGT  
AGGATCTGACTTAGAAATAGGGCAACATAGAGCAAAAATAGAGGAGTTAAGAAAAC  
ATCTGTTAAGGTGGGGATTTACCACACCGGACAAGAAACATCAGAAAGAACCCCA  
TTTTCTTTGGATGGGGTATGAACTCCATCCTGACAAATGGACAGTACAGCCTATAGAG  
TTGCCAGAAAAGGAAAGCTGGACTGTCAATGATATACAGAAGTTAGTGGGAAAATT  
AAATTGGGCCAGTCAGATTTACCCAGGAATTAAGTAAGGCAACTTTGTAACTCCT  
TAGGGGGGCCAAAGCACTAACAGATATAGTACCACTAACTGAAGAAGCAGAATTAG  
AATTGGCAGAGAACAGGGAAATTCTAAGAGAACCAGTACATGGAGTATATTATGAC  
CCATCAAAAGACTTGGTAGCTGAAATACAGAAACAGGGGCATGACCAATGGACATA  
TCAAATTTACCAAGAACCATTCAAAAACCTGAAAACAGGGGAAGTATGCAAAAATGA  
GGACTGCCCACACTAATGATGTAAAACAGTTAACAGAGGCAGTGCAAAAAATAGCT  
ATGGAAAGCATAGTAATATGGGGAAAGACTCCTAAATTTAGACTACCCATCCAAAA  
AGAAACATGGGAGACATGGTGGACAGACTATTGGCAAGCCACCTGGATTCTGAGT  
GGGAGTTTGTTAATACCCCTCCCTTAGTAAAATTATGGTACCAGCTAGAGAAAGAAC  
CCATAATAGGAGCAGAACTTTCTATGTAGATGGAGCAGCTAATAGGGAACTAAA  
ATAGGAAAAGCAGGGTATGTTACTGACAGAGGAAGGCAGAAAAATTGTTTCTCTAAC  
AGAAACAACAAATCAGAAGACTGAATTACAAGCAATTCAGCTAGCTTTGCAAGATTC  
AGGATCAGAAGTAACATAGTAACAGACTCACAGTATGCATTAGGAATCATTCAAG  
CACAACCAGATAAGAGTGAATCAGAGTTAGTCAACCAAATAATAGAACAATTAATA  
AAAAAGGAAAAGGTCTACCTGTATGGGTACCAGCACATAAAGGAATTGGAGGAAA  
TGAACAAATAGATAAATTAGTAAGTAAGGGAATCAGGAAAGTGCTGTTTCTAGATG  
GAATAGAT

FIG. 13





17/23

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SEQ ID NO:36

GGCGGCATCGTGATCTACCA GTACATGGACGACCTGTACGTGGGCAGCGGCG  
GC

**FIG. 14**



Barnett et al. 09/610,313  
Polynucleotides Encoding Antigenic  
HIV Type C Polypeptides,  
Polypeptides and Uses Thereof

18/23

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SEQ ID NO: 37

GGIVTYQYMDDLYVGSGG

FIG. 15



19/23

12\_5/1ZA (SEQ ID NO:45)

TGGAAGGGTTAATTTACTCCAGGAAAAGGCAAGAGATCCTTGATTTATGGGTCTATC  
ACACACAAGGCTACTTCCCTGATTGGCAAACTACACACCGGGACCAGGGGTCAGA  
TATCCACTGACCTTTGGATGGTGCTTCAAGCTAGTGCCAGTTGACCCAAGGGAAGTA  
GAAGAGGCCAACGGAGGAGAAGACAAGTGTACAGTGGAAGTTTGACAGCAGCCTAGCAC  
AATGGATGATGAACACAAAGAAGTGTACAGTGGAAGTTTGACAGCAGCCTAGCAC  
GCAGACACCTGGCCCGCGAGCTACATCCGATTATTACAAAGACTGCTGACACAGA  
AGGGACTTTCCGCCTGGGACTTTCCACTGGGGCGTTCCAGGGGGAGTGGTCTGGGCG  
GGACTGGGAGTGGCCAGCCCTCAGATGCTGCATATAAGCAGCGGCTTTTCGCCTGTA  
CTGGGTCTCTAGGTAGACCAGATCCGAGCCTGGGAGCTCTCTGTCTATCTGGGGA  
ACCCACTGCTTAGGCCTCAATAAAGCTTGCCTTGAGTGCTCTAAGTAGTGTGTGCCC  
ATCTGTTGTGTGACTCTGGTAACTCTGGTAACTAGAGATCCCTCAGACCCTTTGTGGT  
AGTGTGGAATACTCTAGCAGTGGCGCCCGAACAGGGACTTGAAAGCGAAAGTGAG  
ACCAGAGAAGATCTCTCGACGCAGGACTCGGCTTGCTGAAGTGCCTCGGCAAGAG  
GCGAGGGGGGCGACTGGTGAGTACGCCAAAATTTTTTTTACTAGCGGAGGCTAGA  
AGGAGAGAGATGGGTGCGAGAGCGTCAATATTAAGAGGGGGGAAAATTAGACAAAT  
GGGAAAAAATTAGGTTACGGCCAGGGGGGAGAAAACACTATATGCTAAAACACCTA  
GTATGGGCAAGCAGAGAGCTGGAAAGATTTGCAGTTAACCTGGCCTTTTAGAGAC  
ATCAGACGGATGTAGAC AAATAATAAAACAGCTACAACCAGCTCTTCAGA  
CAGGAACAGAGGAAATTAGATCATTATTTAACACAGTAGCAACTCTCTATTGTGTAC  
ATAAAGGGATAGATGTACGAGACACCAAGGAAGCCTTAGACAAGATAGAGGAGGA  
ACAAAACAAATGTCAGCAAAAAACACAGCAGGCGGAAGCGGCTGACAAAAAGGTC  
AGTCAAAATTATCCTATAGTGCAGAACCTCCAAGGGCAAATGGTACACCAGGCCAT  
ATCACCTAGAACCTTGAATGCATGGGTAAAAGTAATAGAGGAGAAGGCTTTTAGCC  
CAGAGGTAATACCCATGTTTACAGCATTATCAGAAGGAGCCACCCCAAGATTTA  
AACACCATGTAAATACAGTGGGGGGACATCAAGCAGCCATGCAAATGTAAAG  
ATACCATCAATGAGGAGGCTGCAGAATGGGATAGGTTACATCCAGTACATGCAGGG  
CCTGTTGCACCAGGCCAGATGAGAGAACCAAGGGGAAGTGACATAGCAGGAACCTA  
CTAGTACCCTTCAAGAACAAATAGCATGGATGACAAGTAACCCACCTATCCCAGTA  
GGGGACATCTATAAAAGGTGGATAATTCTGGGGTTAAATAAAATAGTAAGAATGTA  
CAGCCCTGTCAGCATTTTAGACATAAAACAAGGACCAAGGAACCTTTAGAGACT  
ATGTAGACCGGTTCTTCAAACTTTAAGAGCTGAACAATCTACACAAGAGGTAAAA  
AATTGGATGACAGACACCTTGTTAGTCCAAAATGCGAACCAGATTGTAAGACCATT  
TTAAGAGCATTAGGACCAGGGGCTTCATTAGAAGAAATGATGACAGCATGTCAGGG  
AGTGGGAGGACCTAGCCACAAAGCAAGAGTTTTGGCTGAGGCAATGAGCCAAGCAA  
ACAATACAAGTGTAATGATACAGAAAAGCAATTTTAAAGGCCCTAGAAGAGCTGTT  
AAATGTTTCAACTGTGGCAGGGAAGGGCACATAGCCAGGAATTGCAGGGCCCCTAG  
GAAAAGGGGCTGTTGGAATGTGGAAGGAAGGACACCAATGAAAGACTGTACT  
GAGAGGCAGGCTAATTTTTAGGGAAAATTTGGCCTTCCCACAAGGGGAGGCCAGG  
GAATTCCTTCAGAGCAGACCAGAGCCAACAGCCCCACCTAGAACCAACAGCCC  
CACCAGCAGAGAGCTTCAAGTTCAAGGAGACTCCGAAGCAGGAGCCGAAAGACAG  
GGAACCTTTAACTTCCCTCAAATCACTCTTTGGCAGCGACCCCTGTCTCAATAAAA

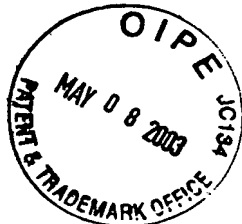
FIG. 16A



20/23

GTAGCGGGCCAAACAAAGGAGGCTCTTTTAGATACAGGAGCAGATGATACAGTACT  
AGAAGAAATAAACTTGCCAGGAAAATGGAAACCAAAAATGATAGGAGGAATTGGA  
GGTTTTATCAAAGTAAGACAGTATGATCAAATACTTATAGAAATTTGTGGAAAAAGG  
GCTATAGGTACAGTATTAGTAGGACCTACACCTGTCAACATAATTGGAAGAAATCTG  
TTGACTCAGCTTGATGCACACTAAATTTTCCAATTAGCCCCATTGAAACTGTACCA  
GTAAAATTAAGCCAGGAATGGATGGCCCAAAGGTTAAACAATGGCCATTGACAGA  
AGAAAAAATAAAAGCATTAAACAGAAATTTGTGAGGAAATGGAGAAGGAAGGAAAA  
ATTACAAAAATTGGGCCTGAAAATCCATATAACACTCCAGTATTTGCCATAAAGAAG  
AAGGACAGTACAAAGTGGAGAAAATTAGTAGATTTTCAGGGAACTCAATAAAAGAAC  
TCAAGACTTTTGGGAAGTCCAATTAGGAATACCACACCCAGCAGGGTTAAAAAGA  
AAAAATCAGTGACAGTACTGGATGTGGGAGATGCATATTTTCAGTCCCTTTAGATG  
AGAGCTTCAGAAAATATACTGCATTCACCATACTAGTATAAAACAATGAAACACCA  
GGGATTAGATATCAATATAATGTTCTTCCACAGGGATGGAAAGGATCACCAGCAA  
TATTCCAGAGTAGCATGACAAGAATCTTAGAGCCCTTTAGAACACAAAACCCAGAA  
GTAGTTATCTATCAATATATGGATGACTTATATGTAGGATCTGACTTAGAAATAGGG  
CAACATAGAGCAAAAATAGAGGAGTTAAGAGGACACCTATTGAAATGGGGATTTAC  
CACACCAGACAAGAAACATCAGAAAGAACCCCCATTTCTTTGGATGGGGTATGAAC  
TCCATCCTGACAAATGGACAGTACAGCCTATACAGCTGCCAGAAAAGGAGAGCTGG  
ACTGTCAATGATATACAGAAAGTTAGTGGGAAAGTTAAACTGGGCAAGTCAGATTTA  
CCCAGGGATTAAAGTAAGGCAACTGTGTAAACTCCTTAGGGGAGCCAAAGCACTAA  
CAGACATAGTGCCACTGACTGAAGAAGCAGAATTAGAATTGGCTGAGAACAGGGA  
AATTCTAAAAGAACCAGTACATGGAGTATATTATGACCCATCAAAAGATTTAATAG  
CTGAAATACAGAAACAGGGGAATGACCAATGGACATATCAAATTTACCAAGAACC  
ATTTAAAAATCTGAGAACAGGAAAGTATGCAAAAATGAGGACTGCCACACTAATG  
ATGTGAAACAGTTAGCAGAGGCAGTGCAAAAGATAACCCAGGAAAGCATAGTAATA  
TGGGGAAAAACTCCTAAATTTAGACTACCCATCCCAAAAGAAACATGGGAGACATG  
GTGGTCAGACTATTGGCAAGCCACCTGGATTCTGAGTGGGAGTTTGTCAATACCCC  
TCCCCTAGTAAATTTGTGGTACCAGCTGGAAAAAGAACCCATAGTAGGGGCAGAAA  
CTTTCTATGTAGATGGAGCAGCCAATAGGGAAACTAAAATAGGAAAAGCAGGGTAT  
GTCCTGACAAAGGAAGGCAGAAAGTTGTTTCCTTCACTGAAACAACAAATCAGAA  
GACTGAATTACAAGCAATTCAGCTAGCTTTGCAGGATTCAGGGCCAGAAGTAAACA  
TAGTAACAGACTCACAGTATGCATTAGGAATCATTCAAGCACAACCAGATAAGAGT  
GAATCAGAATTAGTCAGTCAAATAATAGAACAGTTGATAAAAAAGGAAAAAGTCTA  
CCTATCATGGGTACCAGCACATAAAGGAATTGGAGGAAATGAACAAGTAGACAAAT  
TAGTAAGTAGTGGAATCAGAAAAGTACTGTTTCTAGATGGAATAGATAAAGCTCAA  
GAAGAGCATGAAAAATATCACAGCAATTGGAGAGCAATGGCTAGTGAGTTTAATCT  
GCCACCCATAGTAGCAAAGGAAATAGTAGCCAGCTGTGATAAATGTCAGCTAAAAG  
GGGAAGCCATGCATGGACAAGTCGACTGTAGTCCAGGAATATGGCAATTAGACTGT  
ACACATTTAGAAGGAAAAATCATCCTAGTAGCAGTCCATGTAGCCAGTGGCTACAT  
GGAAGCAGAGGTTATCCCAGCAGAAACAGGACAAGAAACAGCATACTTTATACTAA  
AATTAGCAGGAAGATGGCCAGTCAAAGTAATACATACAGATAATGGCAGTAATTTT  
ACCAGTACCGCAGTTAAGGCAGCCTGTTGGTGGGCAGATATCCAACGGGAATTTGG  
AATCCCTACAATCCCCAAAGTCAAGGAGTAGTAGAATCCATGAATAAAGAATTAA

FIG. 16B



AGAAAATCATAGGGCAAGTAAGAGATCAAGCTGAGCACCTTAAGACAGCAGTACAA  
ATGGCAGTATTCATTCCACAATTTTAAAAGAAAAGGGGGGATTGGGGGGTACAGTGC  
AGGGGAGAGAATAATAGACATAATAGCATCAGACATACAACTAAAGAATTACAAA  
AACAAATTATAAAAATTCAAAATTTTCGGGTTTATTACAGAGACAGCAGAGACCCTA  
TTTGGAAGAGGACCAGCCAACTACTCTGGAAAGGTGAAGGGGCAGTAGTAATACAA  
GATAATAGTGATATAAAGGTAGTACCAAGAAGGAAAGCAAAAATCATTAAAGGACTA  
TGGAAAACAGATGGCAGGTGCTGATTGTGTGGCAGGTAGACAGGATGAAGATTAGA  
ACATGGCACAGTTTAGTAAAGCACCATATGTATGTTTCGAGGAGAGCTGATGGATGG  
TTCTACAGACATCATTATGAAAGCAGACACCCAAAAGTAAGTTCAGAAGTACACAT  
CCCATTAGGAGATGCCAGGTAGTAATAAAAACATATTGGGGTCTGCAGACAGGAG  
AAAGAGCTTGGCATTGTTGGGTACGGAGTCTCCATAGAATGGAGATTGAGAAGATAT  
AGCACACAAGTAGACCCTGACCTGACAGACCACTAATTCATATGCATTATTTTGAT  
TGTTTTGCAGAATCTGCCATAAGGAAAGCCATACTAGGACAGATAGTTAGCCCTAA  
GTGTGACTATCAAGCAGGACATAACAAGGTAGGATCTCTACAATACTTGGCACTGA  
CAGCATTGATAAAACCAAAAAGATAAAGCCACCTCTGCCTAGTGTTAGGAAATTA  
GTAGAGGATAGATGGAACAAGCCCCAGAAGACCAGGGGCCGAGAGGGAACCATA  
CAATGAATGGACACTAGAGCTTTTAGAAGAACTCAAGCAGGAAGCTGTCAGACACT  
TTCCTAGACCATGGCTCCATAACTTAGGACAACATATCTATGAAACCTATGGAGATA  
CTTGGACAGGAGTTGAAGCAATAATAAGAATCCTGCAACAATTACTGTTTATTCATT  
TCAGGATTGGGTGCCATCATAGCAGAATAGGCATTTTGCAGACAGAGAAGAGCAAGA  
AATGGAGCCAATAGATCCTAACCTAGAACCCTGGAACCATCCAGGAAGTCAGCCTA  
AACTGCTTGTAATGGGTGTTACTGTAAACGTTGCAGCTATCATTGTCTAGTTTGCTT  
TCAGAAAAAAGGCTTAGGCATTTACTATGGCAGGAAGAAGCGGAGACAGCGACGAA  
GCGCTCCTCCAAGCAATAAAGATCATCAAGATCCTCTACCAAAGCAGTAAGTACCG  
AATAGTATATGTAATGTTAGATTTAACTGCAAGAATAGATTCTAGATTAGGAATAGG  
AGCATTGATAGTAGCACTAATCATAGCAATAATAGTGTGGACCATAGTATATATAG  
AATATAGGAAATTGGTAAGGCAAAGGAAAATAGACTGGTTAGTTAAAAGGATTAGG  
GAAAGAGCAGAAGACAGTGGCAATGAGAGCGAGGGGGATACTGAAGAATTATCGA  
CACTGGTGGATATGGGGCATCTTAGGCTTTTGGATGCTAATGATGTGTAATGTGAA  
GGGCTTGTGGGTCACAGTCTACTACGGGGTACCTGTGGGGAGAGAAGCAAAAACCT  
ACTCTATTTTGTGCATCAGATGCTAAAGCATATGAGAAAGAAGTGCATAATGTCTG  
GGCTACACATGCCTGTGTACCCACAGACCCCAACCCACAAGAAGTGATTTTGGGC  
AATGTAACAGAAAATTTTAACATGTGGAAAAATGACATGGTGGATCAGATGCAGG  
AAGATATAATCAGTTTATGGGATCAAAGCCTTAAGCCATGTGTAAAAITGACCCCA  
CTCTGTGTCACTTTAACTGTACAAATGCAACTGTAACTACAATAATACCTCTAAA  
GACATGAAAAATTGCTCTTTCTATGTAACCACAGAATTAAGAGATAAGAAAAAGAA  
AGAAAATGCACTTTTTTATAGACTTGATATAGTACCACTTAATAATAGGAAGAATGG  
GAATATTAACAACTATAGATTAATAAATTGTAATACCTCAGCCATAACACAAGCCTG  
TCCAAAAGTCTCGTTTGACCCAATTCCTATACATTATTGTGCTCCAGCTGGTTATGCG  
CCTCTAAAATGTAATAATAAGAAATTCATGGAATAGGACCATGCGATAATGTGAG  
CACAGTACAATGTACACATGGAATTAAGCCAGTGGTATCAACTCAATTACTGTTAAA  
TGGTAGCCTAGCAGAAGAAGAGATAATAATTAGATCTGAAAATCTGACAAACAATG  
TCAAAACAATAATAGTACATCTTAATGAATCTATAGAGATTAAATGTACAAGACC

FIG. 16C



22/23

TGGCAATAATACAAGAAAGAGTGTGAGAATAGGACCAGGACAAGCATTCTATGCA  
ACAGGAGACATAATAGGAGATATAAGACAAGCACATTGTAACATTAGTAAAAATGA  
ATGGAATACAACCTTTACAAAGGGTAAGTCAAAAATTACAAGAACTCTTCCCTAATA  
GTACAGGGATAAAATTTGCACCACACTCAGGAGGGGACCTAGAAATTACTACACAT  
AGCTTTAATTGTGGAGGAGAATTTTCTATTGCAATACAACAGACCTGTTTAATAGT  
ACATACAGTAATGGTACATGCACTAATGGTACATGCATGTCTAATAATACAGAGCG  
CATCACACTCCAATGCAGAATAAAACAAATTATAAACATGTGGCAGGAGGGTAGGAC  
GAGCAATGTATGCCCCTCCCATTGCAGGAAACATAACATGTAGATCAAATATTACA  
GGACTACTATTAACACGTGATGGAGGAGATAATAATACTGAAACAGAGACATTTCAG  
ACCTGGAGGAGGAGACATGAGGGACAATTGGAGAAGTGAATTATATAAATACAAG  
GTGGTAGAAAATTAAACCATTAGGAGTAGCACCCACTGCTGCAAAAAGGAGAGTGGT  
GGAGAGAGAAAAAAGAGCAGTAGGAATAGGAGCTGTGTTCTTGGGTTCTTGGGAG  
CAGCAGGAAGCACTATGGGCGCAGCATCAATAACGCTGACGGTACAGGCCAGACAA  
TTATTGTCTGGTATAGTGCAACAGCAAAGTAATTTGCTGAGGGCTATAGAGGCGCAA  
CAGCATATGTTGCAACTCACGGTCTGGGGCATTAAAGCAGCTCCAGGCAAGAGTCCTG  
GCTATAGAGAGATACCTACAGGATCAACAGCTCCTAGGACTGTGGGGCTGCTCTGG  
AAAACCTCATCTGCACCACTAATGTGCTTTGGAACCTCTAGTTGGAGTAATAAACTCA  
AAGTGATATTTGGGATAACATGACCTGGATGCAGTGGGATAGGGAAATTAGTAATT  
ACACAAACACAATATACAGGTTGCTTGAAGACTCGCAAAGCCAGCAGGAAAGAAA  
TGAAAAAGATTTACTAGCATTGGACAGGTGGAACAATCTGTGGAATTGGTTTAGCAT  
AACAAATTGGCTGTGGTATATAAAAAATATTCATAATGATAGTAGGAGGCTTGATAG  
GTTTAAGAATAATTTTGTGCTGTGCTCTCTCTAGTAAATAGAGTTAGGCAGGGATACT  
CACCTTGTTCATTGCAGACCCTTATCCCAAACCCGAGGGGACCCGACAGGCTCGGA  
GGAATCGAAGAAGAAGGTGGAGAGCAAGACAGCAGCAGATCCATTGATTAGTGA  
GCGGATTCTTGACACTTGCCTGGGACGACCTACGAAGCCTGTGCCTCTTCTGCTACC  
ACCGATTGAGAGACTTCATATTAATTGTAGTGAGAGCAGTGGAACTTCTGGGACAC  
AGTAGTCTCAGGGGACTGCAGAGGGGGTGGGGAACCTTAAGTATTTGGGGAGTCT  
TGTGCAATATTGGGGTCTAGAGTTAAAAAAGAGTGCTATTAATCTGCTTGATACTAT  
AGCAATAGCAGTAGCTGAAGGAACAGATAGGATTCTAGAATTCATACAAAACCTTT  
GTAGAGGTATCCGCAACGTACCTAGAAGAATAAGACAGGGCTTCGAAGCAGCTTTG  
CAATAAAATGGGGGGCAAGTGGTCAAAAAGCAGTATAATTGGATGGCCTGAAGTAA  
GAGAAAGAATCAGACGAAGTGGTCAAAAAGCAGTATAATTGGATGGCCTGAAGTAA  
AGACTTAGAGAAACATGGGGCACTTACAACCAGCAACACAGCCCACAACAATGCTG  
CTTGCGCCTGGCTGGAAGCGCAAGAGGAGGAAGGAGAAGTAGGCTTTCCAGTCAGA  
CCTCAGGTACCTTTAAGACCAATGACTTATAAAGCAGCAATAGATCTCAGCTTCTTT  
TTAAAAGAAAAGGGGGGACTGGAAGGGTTAATTTACTCCAAGAAAAGGCAAGAGAT  
CCTTGATTTGTGGGTTTATAACACACAAGGCTTCTTCCCTGATTGGCAAACTACAC  
ACCGGGACCAGGGGTCAGATTTCCACTGACCTTTGGATGGTACTTCAAGCTAGAGCC  
AGTCGATCCAAGGGAAGTAGAAGAGGCCAATGAAGGAGAAAACAAGTGTACTAC  
ACCTATGAGCCAGCATGGAATGGAGGATGAAGACAGAGAAGTATTAAGATGGAAG  
TTTGACAGTACGCTAGCACGCAGACACATGGCCCGCGAGCTACATCCGGAGTATTAC  
AAAGACTGCTGACACAGAAGGGACTTTCCGCTGGGACTTTCCACTGGGGCGTTCCAG  
GAGGTGTGGTCTGGGCGGGACAGGGGAGTGGTCAGCCCTGAGATGCTGCATATAAG  
CAGCTGCTTTTCGCCTGTACTGGGTCTCTCTAGGTAGACCAGATCTGAGCCCGGGAG

FIG. 16D



23/23

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CTCTCTGGCTATCTAGGGAACCCACTGCTTAAGCCTCAATAAAGCTTGCCTTGAGTG  
CCTTGAGTAGTGTGTGCCCCGTCTGTTGTGTGACTCTGGTAACTAGAGATCCCTCAGA  
CCACTTGTGGTAGTGTGGAAAATCTCTAGCA

FIG. 16E